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Structural Analysis and Design of Nuclear Plant Facilities

AMERICAN SOCIETY of CIVIL ENGINEERS

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Committee on Nuclear Structures and Materials
of the Structural Division of the
American Society of Civil Engineers

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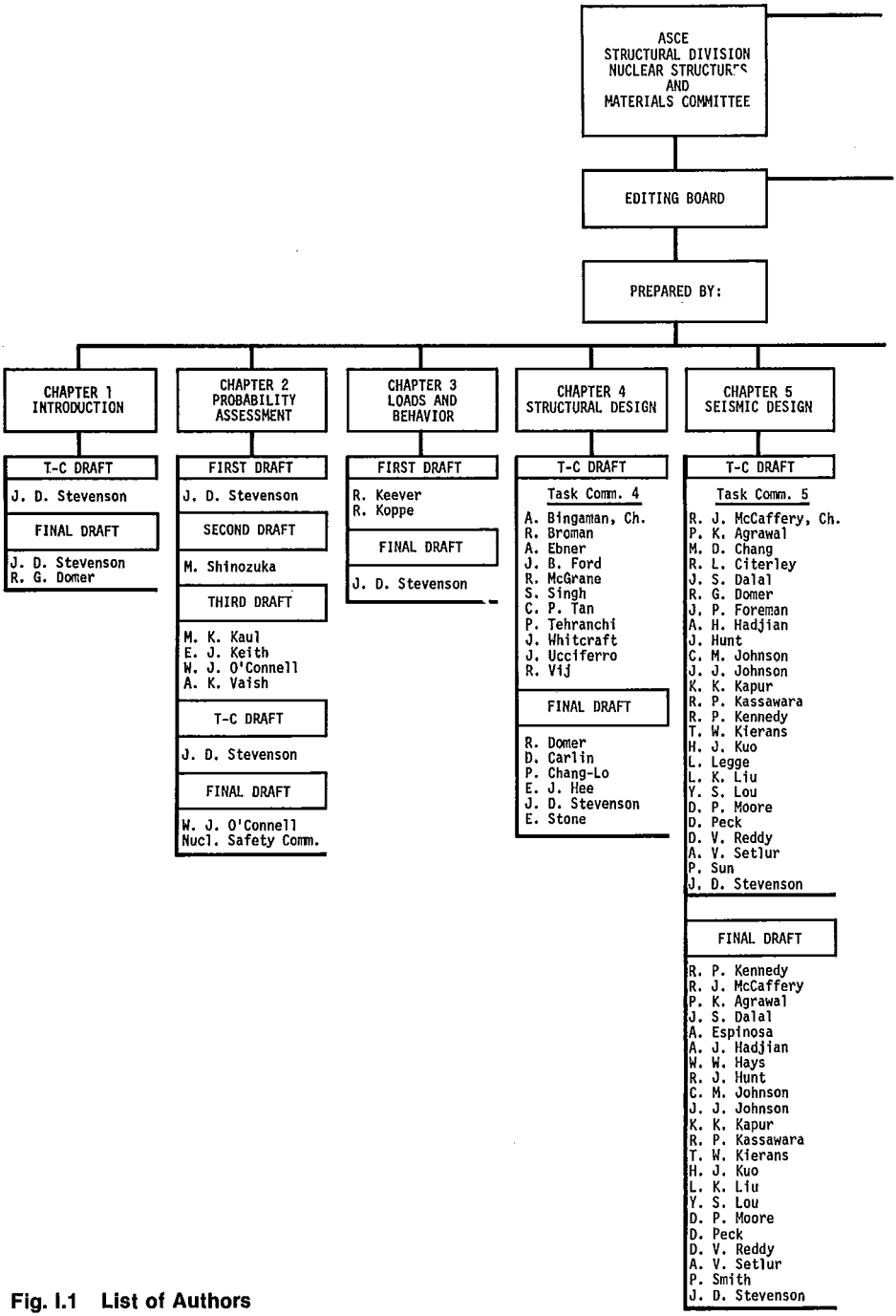


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Chapter 1

Introduction

1.1 PURPOSE AND SCOPE

This Manual is written for the engineering profession as a guide in the design of nuclear structures important to public safety. Such structures in addition to carrying normal dead and live service loads, are intended to resist the consequences of postulated accidents and extreme load environmental effects on commercial nuclear facilities. The Manual combines, in a single document, the general design requirement and philosophy peculiar to nuclear safety class facilities which have developed in detail since 1965. This document is intended to complement existing codes and standards and to present a broad engineering design philosophy and summary, rather than to provide specific criteria which are detailed in nature and subject to frequent revision.

In general, the procedures described in the Manual are applicable to large commercial or central station nuclear power plants. But these procedures may also be applied to any facility where the consequences or risk associated with postulated accidents or extreme environment effects, require protection and evaluation of events in a range of 10^{-7} probability of occurrence per year during the life of the structure. This compares to conventional structural design where probabilities of occurrences of phenomena explicitly considered in design normally are not less than 10^{-3} probability per year.

This Manual is intended for use by engineers having a basic background in the design of conventional structures subjected to normal (principally static) loads. Accordingly, such knowledge on the part of the reader is presumed. Only a brief treatment is included on mechanical and electrical aspects of design, since these are adequately covered by current American Society of Mechanical Engineers (ASME)(1) and Institute of Electrical and Electronic Engineers (IEEE)(2), requirements.

Throughout the Manual the terms "shall," "should," and "may" are found. These terms are not used to imply any requirement for compliance or non-compliance with statements made in this Manual. They are used only to indicate levels of applicability, emphasis, or degree of consensus expressed by the authors of the Manual.